TPS 9
Transient Voltage Surge Suppressor
User's Manual

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⚠ WARNING

- **Confirm XO N-G Bonding at Upstream Transformer**
- **Do Not Hi-Pot Test TVSS**
- **Resulting Damage is Not Covered Under Warranty**

WARNING - - IMPORTANT - - PLEASE READ - - WARNING

INSTALLATION - BONDING AND GROUNDING HAZARD: Verify the neutral conductor in the service entrance equipment is bonded to ground in accordance with the National Electrical Code and verify the neutral terminals (XO) on the secondary side of distribution transformers are grounded to the system ground in accordance with NEC and all applicable codes.

During installation into an electrical system, the TPS must not be energized until the electrical system is completely installed, inspected and tested. All conductors must be connected and functional including the neutral (if required). The voltage rating of the device and system must always be verified before energizing the TPS.

Failure to follow these guidelines can lead to abnormally high voltage at the TPS. This may cause the TPS to become inoperative. **The warranty is voided if this device is incorrectly installed and/or if neutral conductor in the service entrance equipment is not bonded to ground in accordance with the National Electrical Code (NEC).**

TESTING - HIGH VOLTAGE TESTING - DO NOT HI-POT TEST: Any factory or on-site testing of power distribution equipment that exceeds the normal operating voltage such as high-potential insulation testing, or any other tests where the suppression components will be subjected to voltages higher than their rated turn on voltage must be conducted with the suppressor **disconnected** from the power source. For 4-wire TPS devices, the neutral connection at the TPS must also be **disconnected** prior to performing high-potential testing and then reconnected upon completion of the test.

Failure to disconnect this surge suppression device and its associated suppression components during elevated voltage testing will damage suppression components and/or other electronic components, **and will void the warranty.**

Save this manual! It includes instructions for obtaining warranty service and returning a defective unit.

INTRODUCTION

Thank you for choosing the Siemens TPS9 Transient Voltage Surge Suppressor.

This manual provides instructions for installing the TPS9 Transient Voltage Surge Suppressor (TVSS). The TPS9 TVSS (Figure 1) can be mounted three ways. The preferred method of installation is to mount the TVSS directly to the outside of the electrical distribution equipment using the integral chase nipple on the body of the TVSS. It can also be installed against a panel/wall using installer supplied hardware, or it can be installed using an optional Flush Mount Kit. The latter two methods require use of additional conduit and hardware (not provided).

Please read and understand all information in this manual prior to installation. The procedures contained herein are not intended to supersede local or national electrical codes. **Check all applicable electrical codes to ensure compliance.** In all instances, local and national electrical code requirements are to be followed.

The TPS9 is a single port parallel TVSS designed for service entrance and downstream electrical distribution equipment applications. The TVSS uses a chase nipple for installation, and offers 80kA, 100kA, 120kA, or 150kA per phase surge current capabilities.

The TPS9 provides protection from damaging transient voltage surges and spikes. Proper installation is imperative to maximize the effectiveness and overall performance of this device. **This device must be installed by a licensed electrician.** The electrician should follow the steps outlined in this manual to insure proper installation.

Note: Siemens products are extensively tested to industry standards as set by IEEE C62.41 and C62.45, for Categories A, B, and C. The TPS9 is listed to the most recent edition of UL 1449. **This product is suitable for installation on electrical distribution equipment capable of delivering not more than 200,000 rms symmetrical amperes.**

This device features internal overcurrent and overtemperature protection that will disconnect affected surge protection components at the end of their useful life but will maintain power to the load - now unprotected. If this situation is undesirable for the application, follow these instructions for servicing or replacing the device.

During installation into an electrical system, the TPS9 must NOT be energized until the electrical system is installed, inspected and tested. Confirm that N-G bonding is per NEC. All conductors must be connected and functional, including neutral (if required). The voltage rating of the device and system must always be verified before energizing the TVSS.

Failure to follow the guidelines in this manual can lead to abnormally high voltage being applied to the TVSS. This may cause the TPS9 unit to become inoperative. The warranty does not cover an incorrectly installed device.

Failure to disconnect the TVSS during elevated voltage testing will result in damage to the suppression components and/or other electronic components (see Safety Information). **Do not high potential test the distribution system with the TVSS connected.**

PARTS LIST AND INSPECTION

Items included in the package consist of the following:
- 1 TPS9 Transient Voltage Surge Suppressor.
- 1 User's Manual (this document).

If the Flush Mount Kit was ordered, additional parts are supplied as follows:
- 1 Flush Mount Panel
- 1 Flush Mount Installation Instructions
- 4 Pan-head Screws

Carefully inspect each item in the package for signs of damage. If damage is found, please contact Siemens TPS Technical Support: 1.888.333.3545. For more information about this product or other Siemens products, visit www.sea.siemens.com.

SAFETY INFORMATION

This section provides pertinent safety information that must be considered before installing the TVSS.

- Do not install this device during a lightning storm.
- This device is rated NEMA 4X. Suitable for indoor and outdoor applications.
- Do not install the surge protector in a hot or excessively moist location.
- Other safety considerations are as listed on the following page:

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WARNING

VERIFY ALL POWER CIRCUITS ARE DE-ENERGIZED BEFORE MAKING CONNECTIONS

The voltage rating of the device and system must always be verified before energizing the TVSS. All electrical connections should be performed by a qualified (licensed) electrician. All wiring must comply with the National Electrical Code (NEC) and applicable local codes.

- Maintenance of this Transient Voltage Surge Suppressor should be performed by qualified electrical personnel only.
- During normal operation, hazardous voltages are present inside the unit.
- When servicing this unit, be sure to follow all electrical safety precautions.
- All power sources to this unit should be locked off before servicing. This will prevent the risk of receiving an electrical shock.

INSTALLING THE TPS9 TVSS

To install the TVSS to the electrical distribution equipment, proceed as follows:

1. Ensure power to the electrical distribution equipment has been removed. Confirm N-G bonding of system per NEC.
2. Remove the screws securing the outer distribution equipment cover to the distribution equipment (see Figure 1).
3. Select the location where the TVSS will be mounted (should be based on the internal configuration of the distribution equipment and the physical surroundings outside the equipment). Note that the TVSS's lead length must be minimized to achieve maximum performance. Once the location has been determined, drill or punch a 7/8" diameter hole in the top, bottom or side surface of the distribution equipment. The ideal mounting location will also allow the TVSS to be secured to the wall or panel in addition to using the chase nipple.
4. Screw one of the conduit nuts on to the chase nipple until it bottoms out. Note: bonding of the conduit connections to the distribution equipment is not automatic, and must be provided as part of the installation (remove paint from the distribution equipment surface prior to installing the TVSS and chase nipple).
5. Push the leads from the TVSS through the 7/8" diameter hole toward the inside of the distribution equipment. Push the leading part of the chase nipple through the hole and secure the TVSS using a second conduit nut (sandwiching the metal wall of the distribution equipment between the two conduit nuts).
6. If possible, to provide extra rigidity in the installation, attach the TVSS to the wall or distribution equipment using installer supplied hardware.
7. Trim the leads from the TVSS as short as possible, but still allowing the following connections to be made (see Figure 2):
   - Black wires (one, two, or three in number) go to the nearest free 20 Amp circuit breaker. The phase of each lead is marked with a white band and letter designator (A, B, or C). Connect the TVSS leads to the appropriate phases. (On High-Leg Delta TPS9's, the High-Leg is Phase B, designated with an orange conductor. The orange conductor must be connected to the system's High-Leg.)
   - Connect the white Neutral wire to the neutral bar using a set screw (in some applications, this connection may not be required).
   - Connect the green Ground wire to the electrical distribution equipment ground. Install the distribution equipment cover.
8. Note: Conducting dielectric and/or high potential testing will cause internal damage to the TVSS unit. DO NOT perform dielectric or high potential tests with the phase or neutral TVSS wires connected.
9. Apply power to the distribution equipment. Depending on the TPS9 model, either 1 (single phase applications), 2 (split phase applications), or 3 (three phase applications) LEDs will illuminate on the TVSS. If any connected phase LED on the TVSS does not illuminate, remove power, check all connections and test again. If any connected phase LED still does not illuminate, contact Siemens TPS Technical Support at: 1.888.333.3545.

NOTE: See Page 4 to connect optional Dry Contact or Remote Indicator (if equipped).

CAUTION

BONDING BETWEEN CONDUIT CONNECTIONS **IS NOT** AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION.

CONDUCTING DIELECTRIC AND/OR HIGH POTENTIAL TESTING WILL CAUSE INTERNAL DAMAGE TO THE TVSS UNIT. DO NOT PERFORM DIELECTRIC OR HIGH POTENTIAL TESTS WITH THE PHASE OR NEUTRAL TVSS WIRES CONNECTED.

INSTALLATION WIRING DIAGRAMS

Figure 1
TPS9 Transient Voltage Surge Suppressor Installation (typical)

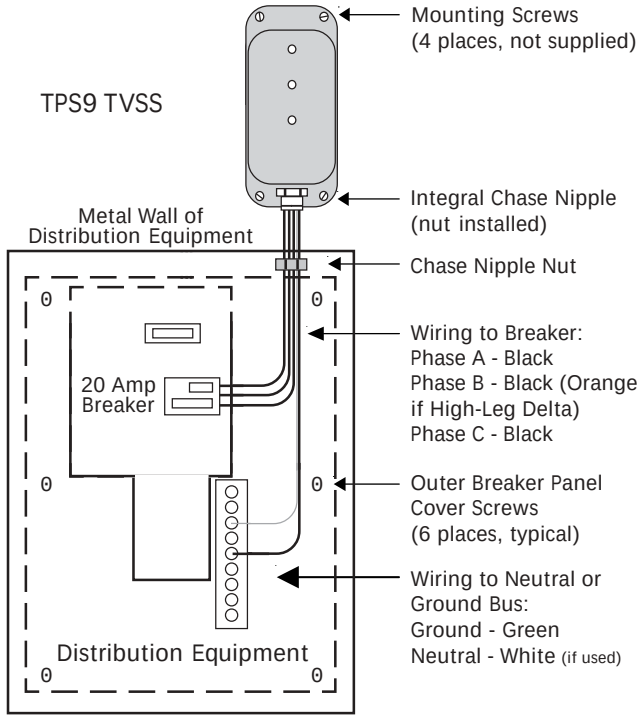
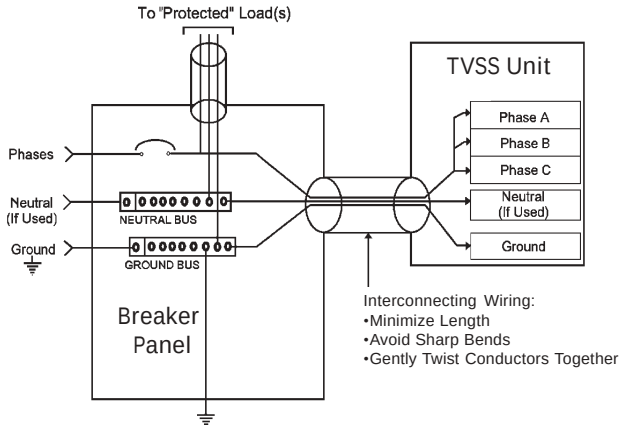
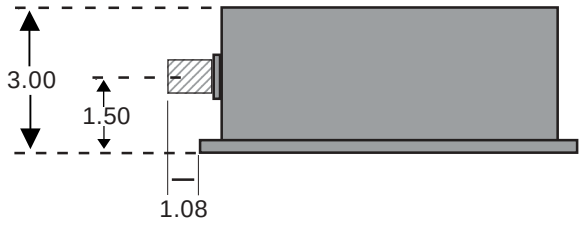


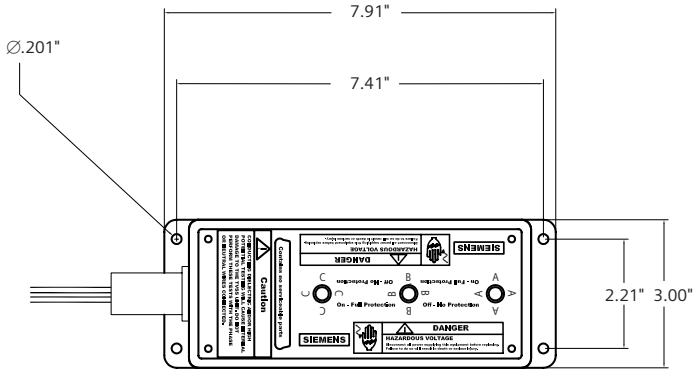
Figure 2
Typical Parallel Connections



DIMENSIONS AND WEIGHT

The TPS9 (all models) weight is 4 lbs.





CAUTION

CONDUCTING DIELECTRIC AND/OR HI-POTENTIAL TESTING WILL CAUSE INTERNAL DAMAGE TO TPS UNIT AND WILL VOID THE UNITS WARRANTY

Do not perform dielectric or high potential tests with the TPS unit installed.

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CONNECTING TO OPTIONAL DRY CONTACTS IF EQUIPPED ("D" SUFFIX NEAR END OF MODEL NUMBER)

The Dry Contact option allows for external evaluation of the SPD's operating condition. A Form C contact changes state during inoperative conditions, including loss of power, either in full, or loss of any individual phase. This can be configured for either Normally Open, or Normally Closed indication.

Connections are made via two of the three 18 AWG wires, pre-wired through the SPD's nipple mounting connection. There is no terminal block connection (ensures cost-effective NEMA 4X compliance). Dry Contact wires are color coded per below and are approximately 5 feet (1.5m) in length. Do not mistake the SPD power connection conductors for the Dry Contact wires. Internal electrical contacts are rated 5A, 120 VAC.

Color code of Dry Contact wires when energized:

- 18 AWG RED - Normally Closed
- 18 AWG GREY - Common
- 18 AWG BLUE - Normally Open

Typical Installation:

- For Normally Closed: Use Red and Grey wires
- For Normally Open: Use Blue and Grey wires

After installation, contacts can be tested by energizing, then deenergizing the SPD, and verifying that contacts change state. An alternate test is to deenergize just one phase.

CONNECTING TO OPTIONAL REMOTE INDICATOR IF EQUIPPED ("R" SUFFIX NEAR END OF MODEL NUMBER)

This option includes a supplemental diagnostic LED that can be mounted in a conspicuous location. For example, assume that the SPD is mounted such that it is not readily visible. A Remote Indicator can provide visual indication of correct operation.

Operation is straightforward: Green LED On = SPD is OK. If the LED is out, the SPD has failed; power is not present, or one or more phases are not energized.

The Green LED assembly includes two pre-attached wires and two butt-splice connectors. The SPD includes two yellow 18 AWG wired, pre-wired through the SPD's nipple mounting connection.

Pre-Plan the installation per normal Installation Instructions. Note that the LED assembly and butt-splice connectors are not weather resistant and should be protected accordingly.

Mount the LED assembly in an appropriate conspicuous location. Drill a 1/4" diameter hole at the mounting location. Remove the hex nut from the back side of the LED assembly and feed the LED indicator wires through the hole. Install the hex nut.

Butt-splice the wires (polarity does not matter) from the LED wiring assembly to the yellow SPD wires by inserting one end of each LED wiring assembly lead into the butt-splice (supplied). Squeeze the metal contact of the butt-splice downward. Ensure the wires cannot be pulled out of the butt-splice. Fold the cover of the butt-splice over the metal contact until the cover of the butt-splice latches to the bottom portion of the butt-splice.

The enclosed label should be placed under the LED for reference. Plan your installation for adequate label space.

After installation, test the Green LED by energizing, then deenergizing the SPD, and verifying that the LED turns on and off appropriately. An alternate test is to deenergize just one phase.

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SPECIFICATIONS

Model	Voltage Rating and Service Type
TPSA9	120/240V Single Phase
TPSB9	240/120V Three Phase, High-Leg, DELTA
TPSC9	208Y/120V Three Phase, WYE
TPSD9	240V Three Phase, DELTA
TPSE9	480Y/277V Three Phase, WYE
TPSF9	480V Three Phase, DELTA
TPSK9	380Y/220V Three Phase, WYE

Item	Specification
Temperature/Operating Temperature/Storage	-40° C (-40° F) to +60° C (+140° F) -55° C (-65° F) to +65° C (+149° F)
Audible Noise	None
Service Clearance	36 inches (94.1 cm) in front of the unit
Installation Type	Chase Nipple
Wire Length vs. Response Time and Let-Through Voltage	1 foot (31.7 cm) of wire = 1 nanosecond. 175 volts per foot (6kV/3kA, 8/20 microseconds) are added to the clamp voltage.
Wire Size and Installation Torque	Wire Size = #12 AWG, Torque to 18 in. lbs.
Circuit Breaker Connection	20 amp
System Grounding	Per IEEE STD 142-1991. For sensitive electronics/computer systems, the recommended ground impedance is 25 ohms or less.

Options	
100 Increases Surge Capacity from 80kA to 100kA	Available on All Models
120 Increases Surge Capacity from 80kA to 120kA	Available **only** on A and C Voltages
150 Increases Surge Capacity from 80kA to 150kA	Available **only** on A and C Voltages
F Flush Mount Kit	Available on All Models
R Remote Indicator	Available on All Models
D Dry Contact	Available on All Models
N Noise Filter	Available on All Models
T Adds N - G (Gas Tube)	Available on All Models

WARRANTY AND CUSTOMER SERVICE

LIMITED WARRANTY

Siemens warrants it's AC electrical distribution equipment protection products against defective workmanship and materials for 5 years. Liability is limited to the replacement of the defective product. A Return Material Authorization number (RA #) must be given by the company prior to the return of any product. Returned products must be sent to the factory with the transportation charges prepaid. In addition, the company also warrants unlimited replacement of modular and component parts within the warranty period previously described.

The company specifically disclaims all other warranties, expressed or implied. Additionally, the company will not be responsible for incidental or consequential damages resulting from any defect in any product or component thereof.

TECHNICAL SUPPORT

1.888.333.3545

This manual, as well as information about the entire Siemens product line are available on the Internet at: www.sea.siemens.com.

Prior to calling Siemens for technical support, please have the following information available:

Model Number of unit: _____

Serial Number of unit: _____

Manufacture Date: _____

Purchase Date: _____

Your Order Number: _____

Return Shipment Address:

Siemens - Attn: RA #_____
14550 58th Street North
Clearwater, FL 33760

Siemens Energy & Automation, Inc.
Power Distribution Infrastructure Division
333 Old Milton Parkway
Alpharetta, GA 30005

1.800.964.4114 ext. 1234
seainfo@icn.siemens.com

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